Appln. of: Schreiber
Serial No.: 10/735,706
Filed: December 16, 2003

REMARKS

Reconsideration and allowance are respectfully requested.

Claims 1, 4-12 and 21-35 are pending in this application with claims 33-35 being new. Claims 2-3 and 13-20 have been cancelled without prejudice.

Claims 1 and 2 stand rejected under 35 USC 102(b) as being anticipated by Clement.

Applicant has amended claim 1 to better define the claimed process. Specifically, applicant has amended claim 1 to distinguish the claimed brazing process over a non-used welding process, as well as to limit the amount of heat introduced into the TiAl components. As amended, none of the cited references, alone or in combination, anticipate or render obvious claim 1.

Clement discloses an embodiment where deposition of the braze onto the TiAl components can be done by "associating a powder feed with a high energy beam such as a laser" (col. 4, lines 47-49). However, Clement does not disclose or suggest that the heat applied to the TiAl components be limited as required in claim 1:

> A method for the joining of TiAl components with a braze having a melting temperature lower than a melting temperature of the TiAl components, comprising:
>
> aligning the TiAl components to form a braze joint therebetween into which molten braze can be deposited;
>
> depositing the braze into the braze joint;
>
> heating the braze with a laser beam to a temperature at which the braze is molten but which temperature is below a melting temperature of the TiAl components, so that the braze adheres to the TiAl components;
>
> limiting heating of the TiAl components to an amount insufficient to change the structure of the components or substantively change the dimensions of the components due to thermal expansion.

In fact, in each embodiment, including the one disclosed, the entire assembly, including the TiAl components, is heated in an oven for a period of time. See, for example, col. 4, lines 39-46. This overall heating is contrary to the method of claim 1, which has the following advantages (page 3, line 31 through page 4, line 20 of the present specification, emphasis added):

> The use of a laser source for fusing the braze enables the heat or energy input to be controlled very precisely. Since the energy of the laser beam, the shape of the laser beam and its position, for example, can be set and controlled with high accuracy, the braze can be melted in a highly controlled manner. The joining process in accordance with the present invention can, therefore, be executed without, or with very low, heat input into the components to be joined. This is advantageous in that the structure of the components is not affected in an undesired manner. Furthermore, dimensional deviations of the components by heat expansion are precluded since virtually no thermal elongation or shrinkage occurs.
>
> The method according to the present invention is particularly well suited for the joining of TiAl sheets. Here, it is particularly advantageous that the sheets, or the components, can be butt joined. Lapped joints or similar joints can, therefore, be dispensed with, the production of these in components made of these materials under stringent accuracy requirements invariably incurring high effort and cost. In the state of the art, such lapped joints can only be produced by superplastic forming or hot forming, for example.
>
> The method according to the present invention allows protective-gas or vacuum furnaces to be dispensed with. The holding or clamping devices for the components can be of very simple design since joining is accomplished at room temperature and under atmospheric pressure.

In view of this, Clement does not disclose or suggest claim 1 as amended and it is respectfully requested that the 102 rejection of claim 1 under Clement be withdrawn.

Claims 1-32 stand rejected under 35 USC 103(a) as being unpatentable over Clement in view of AAPA.

The AAPA does not cure the deficiencies of Clement. None of the AAPA discloses or suggests limiting the heating of the TiAl components through use of a laser brazing process as required in amended claim 1, as discussed above.

For this reason, it is respectfully requested that this rejection of claim 1 under Clement in view of the AAPA be withdrawn.

Claims 1-32 stand rejected under 35 USC 103(a) as being unpatentable over JP61095769 in view of EP0904881 in view of AAPA.

JP61095769 discloses a process for brazing a corrosion preventing member 2 onto a steam turbine blade 1 vie brazing with a laser. There is no disclosure that either component be TiAl, as required in claim 1. Further, there is no disclosure or suggestion that the heating of the components be limited as required in claim 1. In fact, the JP61095769 reference specifically describes heating the corrosion protecting part, albeit to a non-melting level. Therefore, the JP61095769 reference does not disclose or suggest:

> A method for the joining of TiAl components with a braze having a melting temperature lower than a melting temperature of the TiAl components, comprising:
> aligning the TiAl components to form a braze joint therebetween into which molten braze can be deposited;
> depositing the braze into the braze joint;
> heating the braze with a laser beam to a temperature at which the braze is molten but which temperature is below a melting temperature of the TiAl components, so that the braze adheres to the TiAl components;
> limiting heating of the TiAl components to an amount insufficient to change the structure of the components or substantively change the dimensions of the components due to thermal expansion.

EP0904881 is a French counterpart to Clement, discussed above. For the same reasons discussed above, neither EP0904881 nor AAPA cure the deficiencies of JP61095769.

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For these reasons, it is respectfully requested that the rejection of claim 1 under JP61095769 in view of EP0904881 in view of AAPA, be withdrawn.

Since all of the dependent claims depend from claim 1, they are believed allowable for the same reasons as claim 1, as well as for the further limitations contained therein, and it is respectfully requested that the rejections of these dependent claims be withdrawn as well.

In view of the above, it is believed that the application is in condition for allowance and such a Notice is respectfully requested. If anything else is needed to place the application in condition for allowance, it is kindly requested that the undersigned be contacted.

Respectfully submitted,

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